THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 30

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ISAMU HANYU, MITSUJI NUNOKAWA
and SATORU ASAI

Appeal No. 95-1487
Application 07/813,387[1]

HEARD: January 16, 1998

Before KIMLIN, PAK and WALTZ, Administrative Patent Judges.

WALTZ, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1, 2 and 4-16, which are the only claims remaining in this application.

According to appellants, the invention is directed to an optical exposure mask for patterning an optical beam and a method

[1] Application for patent filed December 27, 1991.

for forming a phase shift mask and pattern. The invention basically centers around use of MgO or a compound formed from MgO and Al_2O_3 as an etching stop layer for phase shift masks (main brief, page 2). Claim 1 is illustrative of the subject matter on appeal and is reproduced below:

1. An optical exposure mask for patterning an optical beam, comprising:

an etching stop layer of a material containing MgO or a compound formed from MgO and $A1_2O_3$, said etching stop layer having upper and lower major surfaces and said material being substantially transparent to the optical beam used for the exposure;

a transparent pattern of a material provided on one of said upper and lower major surfaces of said etching stop layer, said transparent pattern passing the optical beam freely; and

an opaque pattern provided on one of said upper and lower major surfaces of said etching stop layer for patterning the optical beam, said opaque pattern being defined be [sic, by] an edge,

said etching stop layer having an etching rate substantially smaller than an etching rate of the material that forms the transparent pattern for any of dry and wet etching processes, and

said transparent pattern being provided along said edge of said opaque pattern and having a thickness set to cancel a diffraction of the optical beam at said edge of said opaque pattern.

The references relied upon by the examiner as evidence of obviousness are as follows:

Nakagawa et al. (Nakagawa) (Japanese Kokai)	61-278179	Dec. 9, 1986
Kawabata et al. (Kawabata)	0 395 425	Oct. 31, 1990

(European Patent Application)

Claims 1, 2 and 4-16 stand rejected under 35 U.S.C. § 103 as unpatentable over Kawabata in view of Nakagawa.[2] We *reverse* this rejection for reasons which follow.

OPINION

The examiner has made the finding that Kawabata discloses a phase shift mask and a method of preparing this mask which includes (a) patterning a light shielding opaque layer (e.g., chrome) on a transparent substrate; (b) depositing on the entire surface an etch stop layer of aluminum oxide (Al_2O_3); (c) depositing a phase shift layer of silicon dioxide on the entire surface to a desired thickness; and (d) then depositing and patterning a resist layer with subsequent etching of the silicon dioxide layer to form the 90^o phase shifter (see Kawabata, page 15, lines 8-20, Figures 45A-E, and the main answer, page 3). The examiner states that the "construction of

[2] A new ground of rejection was made in the main examiner's answer (page 4), rejecting claims 1, 2 and 4-16 under § 103 as unpatentable over Kim et al. (U.S. Patent No. 4,767,724) in view of Smoot et al. (U.S. Patent No. 5,114,813). Appellants submitted a reply brief dated Dec. 7, 1994 (Paper No. 22) in response to the new ground of rejection. The examiner responded with a supplemental examiner's answer dated Dec. 30, 1994 (Paper No. 23). However, according to the letter dated April 8, 1997 (Paper No. 25), the new ground of rejection has been withdrawn. Accordingly, the only rejection on appeal before this merits panel is the rejection of claims 1,2 and 4-16 under § 103 over Kawabata in view of Nakagawa.

the mask and method of making it" as disclosed by Kawabata differs from the claimed construction and method only by the use of MgO as an etch stop layer instead of the aluminum oxide etch stop layer of Kawabata (main answer, page 3). Appellants do not contest these findings (main brief, page 3).

The examiner states that Nakagawa "teaches the use of magnesium oxide as an etching stop layer arranged between the layer to be subjected to etching" (main answer, page 4). The examiner alleges that magnesium oxide and aluminum oxide are used "interchangeably" as is well known in the art and, "because the transmittance properties of the materials used for the etch stop layers is [sic, are] known," it would have been obvious to adjust the material composition to achieve the desired result of transmittance in a known region (main answer, page 4).

Appellants contend that Nakagawa is not related to optical devices and provides no description or suggestion regarding the optical properties of the MgO etching stopper (main brief, page 3). As appellants argue, it is essential that the material forming the mask be substantially transparent to the optical beam. Appellants further argue that, in the absence of the knowledge that MgO has a high transparency for ultraviolet radiation, one of ordinary skill in the art would never be led to

the use of MgO as an etching stopper in a phase shift mask (main brief, page 4).

The fact that Nakagawa teaches the use of MgO as an etch stop layer is not controverted. However, there is no teaching or suggestion in the applied prior art to use MgO as an etch stop layer in a phase shift mask or that MgO has optical properties similar to the aluminum oxide etch stop layer of Kawabata. *See Pro-Mold and Tool Co. v. Great Lakes Plastics Inc.*, 75 F.3d 1568, 1573, 37 USPQ2d 1626, 1629 (Fed. Cir. 1996) ("It is well established that before a conclusion of obviousness may be made based on a combination of references, there must have been a reason, suggestion, or motivation to lead an inventor to combine those references."). The examiner's allegations that the "use of MgO and Al2O3 [sic, $A1_sO_3$] interchangeably is well known in the art, as these materials have similar physical, chemical and etch resistant properties" and "the transmittance properties of the materials used for the etch stop layers is [sic, are] known" are not supported by the facts on the record before us. Where the legal

conclusion of obviousness is not supported by facts, it cannot stand. *In re Warner*, 379 F.2d 1011, 1016-17, 154 USPQ 173, 177-78 (CCPA 1967), *cert. denied*, 389 U.S. 1057 (1968).

For the foregoing reasons, the rejection of claims 1, 2 and 4-16 under 35 U.S.C. § 103 as unpatentable over Kawabata in view of Nakagawa is reversed.

REVERSED

EDWARD C. KIMLIN Administrative Patent Judge	)	
CHUNG K. PAK Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
THOMAS A. WALTZ Administrative Patent Judge	)	

Staas & Halsey
700 Eleventh St., N.W.
Washington, DC 20001